

RANGE EXPANSION NORTHWARD IN ILLINOIS AND
INTO WISCONSIN OF *TRIDENS FLAVUS* (POACEAE)

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ABSTRACT. *Tridens flavus* is reported for the first time from Wisconsin, where specimens from 15 sites in eight southern counties were collected between 1961 and 1997. Nine of these sites were discovered after 1990. In 1997, this grass was collected in three northwestern Illinois counties from which it is previously unreported. Evidence of the recent spread north by this species is discussed.

Key Words: *Tridens*, Poaceae, biogeography

Tridens flavus (L.) A. S. Hitchc. (Poaceae) is native across the eastern U.S. from the Atlantic coast to Nebraska, Kansas, Oklahoma, and Texas, between the southern edge of the Great Lakes and the Gulf of Mexico (Hitchcock and Chase 1950). Its habitat has been described as open sandy areas, sandy prairies, disturbed prairies, dry fields, old fields, pastures, borders of woods, cutover woodland, open woods, rocky glades, waste places, and roadsides (Gress 1924; Small 1933; Deam 1940; Fernald 1950; Hitchcock and Chase 1950; Steyermark 1963; Seymour 1982; Great Plains Flora Association 1986; Mohlenbrock 1986; Eilers and Roosa 1994). Open or relatively open, rather dry, sandy, or disturbed sites are where *T. flavus* grows. Steyermark (1963) wrote, "Although this grass is one of the most abundant in Missouri, it is practically absent from the northern third of nearby Illinois and Indiana." Mohlenbrock (1986) wrote, of *T. flavus* in Illinois, "... common, except in the northern 1/5 of the state where it is apparently very rare."

Tridens flavus was first collected in Wisconsin in 1961, when a single plant was found near the loading zone of the building housing the Botany Dept. at UW–Madison. Vehicular transportation of this propagule seems certain, and the apparent spread north in Illinois and Michigan of this species, particularly along roadways, has been suggested in the literature (Voss 1972; Swink and Wilhelm 1994; Young 1994). The author has repeatedly dis-

covered this grass on roadsides in southern Wisconsin and northwestern Illinois during the years 1991–1997. Fifteen Wisconsin sites are known.

Regional herbaria were checked for Wisconsin specimens of *Tridens flavus*. No specimens other than duplicates are at F, IA, ILL, ILLS, ISC, MIL, MIN, OSH, SIU, UWL, UWSP, or UW-Green Bay. Data reported below are based on specimens deposited in the Herbarium of the University of Wisconsin–Madison (WIS). Nomenclature follows Kartesz (1994), except in the specimen label data which are presented without modification.

SPECIMENS EXAMINED

Illinois. Carroll Co.: Town of Savanna, beside Hwy. 84, 3.75 mi. S of jct. with Hwy. 64, 0.75 mi. S of jct. with Airport Rd., 42°04'15"N, 90°07'35"W, caespitose grass to 1 m high, scattered presence and uncommon along sandy state highway right-of-way on sand plain by Mississippi River, with *Bromus inermis*, 15 Jan 1997, A. H. Williams 97-3 (WIS).

Illinois. Carroll Co.: On verge of road leading from Hwy. 84 to south gate of Savanna Army Depot, 42°11'16"N, 90°14'09"W, caespitose grass to 1 m high, few plants present, at edge of sand plain occupied by Savanna Army Depot, 15 Jan 1997, A. H. Williams 97-4 (WIS).

Illinois. Jo Daviess Co.: On verge of Whitton Rd. at Hanover Bluff State Nature Preserve, 3.3 mi. from Hwy. 84, 42°12'28"N, 90°17'07"W, caespitose grass to 1 m high, few plants present, at edge of sand plain occupied by Savanna Army Depot, 15 Jan 1997, A. H. Williams 97-5 (WIS).

Illinois. Rock Island Co.: Town of Albany, beside Hwy. 84 at 222nd Ave., 41°44'37"N, 90°17'16"W, caespitose grass to 1 m high, widespread and abundant on sandy state highway right-of-way on sand plain by Mississippi River, 15 Jan 1997, A. H. Williams 97-1 (WIS).

Illinois. Whiteside Co.: Town of East Clinton, beside Hwy. 84 at jct. with Hwy. 30, 41°50'38"N, 90°09'27"W, caespitose grass to 1 m high, widespread and abundant on sandy state highway right-of-way on sand plain by Mississippi River, 15 Jan 1997, A. H. Williams 97-2 (WIS).

Wisconsin. Dane Co.: City of Madison, one plant in crack of concrete just below steps at loading zone of Birge Hall and old animal house, 10 Oct 1961, H. H. Iltis 19425 (WIS).

Wisconsin. Grant Co.: 4 mi. NW of Cassville, beside Hwy. VV, T3N R6W S11 SE¼, large patch on grassy roadside, with *Phleum pratense*, *Setaria glauca*, 7 Oct 1972, M. Nee 5363 (WIS).

Wisconsin. Grant Co.: 1 mi. NW of Cassville, along Hwy. VV from Cassville to Nelson Dewey State Park, T3N R5W S19 NW¼ of NE¼, abundant and forming large colonies along grassy open roadside with *Bromus inermis*, *Agropyron repens*, *Digitaria ischaemum*, *Setaria viridis*, *Asclepias syriaca*, two other well-established colonies have been found this year in the vicinity of Cassville (M. Nee 5363, M. Nee 5422), 14 Oct 1972, M. Nee 5402 (WIS).

Wisconsin. Grant Co.: T3N R5W S27 SW $\frac{1}{4}$ of SE $\frac{1}{4}$, abundant, forming large colonies and scattered clumps in grassy, sandy old field with *Eragrostis spectabilis*, *Setaria viridis*, *Ambrosia artemisiifolia*, *Paspalum*, *Leptoloma cognatum*, *Aster*, *Solidago*, 14 Oct 1972, *M. Nee* 5422 (WIS).

Wisconsin. Grant Co.: 3 mi. NW of Cassville, along Hwy. VV, T3N R6W S11 NW $\frac{1}{4}$ of SE $\frac{1}{4}$, rocky or grassy roadside bank at base of Mississippi River bluff with thin woods of *Quercus* spp., *Juglans nigra*, *Rhus typhina*, the bank with a few prairie plants, *Rhus glabra*, *Sporobolus asper*, *Xanthoxylum americanum*, *Verbascum thapsus*. *Tridens flavus* forming patches of many plants, the largest patch 8 m long, a few smaller ones scattered, all on the steep bank on the upper side of the road, there is apparently a larger patch on the lower side of the road but mostly mowed off, this seems to be the only colony of *T. flavus* along Hwy. VV between entrance to Nelson Dewey State Park and where Hwy. VV turns NE out of the Mississippi River valley, this is the same colony collected 7 Oct 1972, as *M. Nee* 5363, 5 Oct 1981, *M. Nee* 22034 (WIS).

Wisconsin. Grant Co.: 1 mi. NW of Cassville, along Hwy. VV, T3N R5W S18 SE $\frac{1}{4}$ of SW $\frac{1}{4}$, steep southwest facing grassy bank below the stone wall of Nelson Dewey State Park and base of Mississippi River bluff with thin woods of *Tilia americana*, *Gleditsia triacanthos*, *Quercus rubra*, the bank with mostly weedy plants such as *Physalis heterophylla*, *Kuhnia eupatorioides*, *Gnaphalium obtusifolium*, *Asparagus officinalis*, *Leptoloma cognatum*; *Tridens flavus* abundant, the dominant grass, common on both sides of Hwy. VV in the mile from entrance of power plant to entrance of Nelson Dewey State Park, on lower side of road common but mostly mowed off, this is the same colony collected 14 Oct 1972 as *M. Nee* 5402, 5 Oct 1981, *M. Nee* 22051 (WIS).

Wisconsin. Grant Co.: 2 mi. E of Cassville along Hwy. 133, T3N R5W S27 SW $\frac{1}{4}$ of SE $\frac{1}{4}$, sandy soil of grassy roadside, old field and edges of cultivated corn field (*Zea mays*), with a mixture of weeds and native prairie species, *Eupatorium altissimum*, *Lespedeza capitata*, *Mirabilis nyctaginea*, *Asclepias verticillata*, *Leptoloma cognatum*, *Spartina pectinata*; *Tridens flavus* abundant on roadside and around edges of old field, this field now mostly planted to corn, not seen in nearby large alluvial gravel pit or from here to Cassville, this is the same colony collected 14 Oct 1972, as *M. Nee* 5422, 5 Oct 1981, *M. Nee* 22063 (WIS).

Wisconsin. Grant Co.: In highway interchange where Eagle Point Rd. meets Hwy. 151, T1N R2W S16 SW $\frac{1}{4}$ of SE $\frac{1}{4}$, one robust plant, many culms, growing with a lot of *Sporobolus asper*, also *Panicum virgatum*, *Aster ericoides*, *A. novae-angliae*, *A. pilosus*, *Rosa* sp., *Rudbeckia hirta*, *Kuhnia eupatorioides*, 2 Oct 1991, *A. H. Williams* 91-234a (WIS).

Wisconsin. Grant Co.: Between Boscobel and Woodman on N side of Hwy. 133, T7N R3W S7 NW $\frac{1}{4}$ of SE $\frac{1}{4}$, dense stand 100 yd. long \times 8 yd. wide, on highway right-of-way alongside red pine plantation and public hunting and fishing grounds, assoc. *Equisetum laevigatum*, *Lactuca canadensis*, *Monarda punctata*, *Ambrosia artemisiifolia*, *Bromus inermis*, *Verbena stricta*, *Daucus carota*, *Verbascum thapsus*, *Andropogon gerardii* (little), *A. scoparius* (little); smooth brome dominant, *Tridens flavus* subdominant, 20 Sep 1992, *T. S. Cochrane* 12918 (WIS) w/ *A. H. Williams*, *J. R. Sime* & *D. Hagar*.

Wisconsin. Grant Co.: N of Cassville, S of Nelson Dewey State Park, T3N R5W S30 NE $\frac{1}{4}$, imm. edge of road, where mowed occasionally, see *M. Nee* 5402 (1972) at WIS, 24 Aug 1995, A. H. Williams 95-51 (WIS). [The author chanced upon this, the second, of Nee's populations.]

Wisconsin. Green Co.: Vale Prairie owned by The Prairie Enthusiasts-Southwest Chapter, E of Monticello, W of Schneeberger Rd., S of Sugar River, T3N R8E S23 NW $\frac{1}{4}$ of SE $\frac{1}{4}$, rocky dry-mesic prairie remnant, mostly slopes north, diverse native flora and old field dominated by smooth brome, *Tridens flavus* has been here for some years, despite its new arrival in Wisconsin, 15 Jan 1996, A. H. Williams 96-2 (WIS). [This grass was discovered here in the mid-1970s; G. Eldred, pers. comm.]

Wisconsin. Iowa Co.: T8N R4E S29 NW $\frac{1}{4}$, sandy soil, 7 Oct 1973, J. Meskill s. n. (WIS).

Wisconsin. Iowa Co.: South verge of Hwy. 14, 0.6 mi. E of Sawle Rd., 0.4 mi. W of Hwy. K, T8N R5E S24 NW $\frac{1}{4}$ of NW $\frac{1}{4}$, loose colony of at least 50 plants in rather sandy soil with *Bromus inermis*, 24 Sep 1996, A. H. Williams 96-34 (WIS). [Part of this population was mowed shortly prior to this collection.]

Wisconsin. Iowa Co.: South verge of Hwy. 14, 1.0 mi. W of Hwy. H, T8N R4E S24 NE $\frac{1}{4}$ of NW $\frac{1}{4}$, colony of at least 30 plants in rather sandy soil with *Paspalum setaceum*, *Poa pratensis*, *Schizachyrium scoparium*, *Cenchrus longispinus*, *Setaria glauca*, *Panicum capillare*, *Digitaria ischaemum* and *Sporobolus cryptandrus*, about half of this colony was recently mowed, 6 Sep 1997, A. H. Williams 97-116 (WIS). [This site is 5.6 mi. W along Hwy. 14 from the site listed immediately above.]

Wisconsin. La Crosse Co.: Northwestern corner of the county, E side of Hwy. 53, just S of Black River, T18N R8W S1 SW $\frac{1}{4}$ of SW $\frac{1}{4}$, couple dozen plants on open grassy sloping right-of-way, 9 Jan 1996, A. H. Williams 96-1 (WIS).

Wisconsin. Marquette Co.: Median strip of Hwy. 51, T17N R9E S1 W $\frac{1}{2}$ of NW $\frac{1}{4}$, site had been planted to prairie species in 1988 or 1989, the seed obtained from a commercial dealer (Jock Engles), the seed itself from Illinois, site was also used for a mowing study on *Elytrigia repens* in which county equipment and crews were used, early Sep 1994, D. R. Spuhler s. n. (WIS).

Wisconsin. Rock Co.: T1N R11E S32, growing along a sandy roadside apparently spontaneously, 18 Sep 1994, A. H. Williams 94-473 (WIS). [About 25 plants were present.]

Wisconsin. Rock Co.: Brockman Property, ca. 0.25 mi. S of Hwy. K, 200 yd. N of Wisconsin-Illinois border, T1N R11E S32 SW $\frac{1}{4}$ of SW $\frac{1}{4}$, sandy open roadside, 28 Sep 1996, A. H. Williams 96-35 (WIS). [About 25 plants were present.]

Wisconsin. Sauk Co.: North verge of Kennedy Rd., scattered single plants and patches along 1.5 miles centered on the jct. with Big Hollow Rd., T8N R3E S10 & 11, growing only on the mowed roadside, not found on the adjacent unmowed railroad right-of-way which supports dry sandy prairie, species growing close to *T. flavus* on the mowed roadside include *Andropogon gerardii*, *Schizachyrium scoparium*, *Paspalum setaceum*, *Digitaria cognata*, *Panicum virgatum*, *P. capillare*, *Bouteloua hirsuta*, *Sorghastrum nutans*, *Eragrostis spectabilis*, *Cenchrus longispinus*, *Setaria glauca*, *S. viridis*,

Sporobolus cryptandrus, *S. vaginiflorus*, *Ambrosia artemisiifolia*, *A. psilostachya*, *Monarda punctata*, *Helianthus occidentalis*, *Opuntia compressa*, *Verbena stricta*, *Euphorbia dentata*, *Amorpha canescens* and *Hieracium longipilum*, 6 Sep 1997, A. H. Williams 97-114 (WIS).

DISCUSSION

Fernald (1950) lists the range of *Tridens flavus* as extending as far north as southern New Hampshire and Minnesota. This is partly in error, as Fassett (1951) does not list this grass for Wisconsin, Ownbey and Morley (1991) do not list it for Minnesota, and neither Hitchcock and Chase (1950) nor Gleason and Cronquist (1991) list it for either state.

Voss (1972), Swink and Wilhelm (1994), and Young (1994) suggest *Tridens flavus* may be adventive in northern Illinois and southern Michigan from farther south, particularly along roadways. Data presented here support the idea of vehicular introduction to 13 of 15 Wisconsin sites, but this is not definite. Even within this small sample, destruction of one of two old field sites by tillage was reported nine years after its discovery. Much of southern Wisconsin is tilled, and established populations are less likely to persist in tilled ground than along open roadsides. And the occurrence of *T. flavus* along roadsides has been reported from across its entire range (Gress 1924; Small 1933; Fernald 1950; Steyermark 1963; Great Plains Flora Association 1986), suggesting the relative openness, dryness, and disturbance characteristic of roadsides may better indicate habitat preference than vehicular transportation of propagules.

Two factors make *Tridens flavus* prominent on the verge in fall: its vertical culms stand up about 1 m, and anthesis is sufficiently late in this species that annual mowing on the right-of-way is often completed shortly prior to anthesis resulting in the taller vegetation on the roadside being, in places, almost exclusively *T. flavus*. The author discovered eight of the 15 Wisconsin sites between September and January while conducting prairie research on many sites around southwestern Wisconsin. Given such extensive travel, it's not surprising that new sites were discovered along roadsides, but it is noteworthy that all of the new sites were on roadsides rather than in prairies, whether or not propagules were transported by vehicles.

Most of these sites are sandy and dry. Mowing is noted on

several specimen labels and surely occurs periodically over the entire width of the rights-of-way where this grass most often grows. County-owned mowing equipment may facilitate the spread of this grass from one roadside area to another. Roadside mowing often is completed in a given year prior to anthesis in this late-flowering grass, which may give this species a competitive advantage on these roadsides. This grass has persisted for years on some Wisconsin sites, and for at least 23 years in the oldest extant population.

In early spring, 1993, a portion of the off-road site in Green Co. was sprayed with Roundup herbicide to kill the dominant *Bromus inermis* in anticipation of a prairie planting the following fall. No other site preparation was done. *Tridens flavus* flourished here relative to the adjacent area that was not sprayed. It was still common and spreading at this site in 1997.

In Illinois, Mohlenbrock and Ladd (1978) showed Rock Island Co. as the northwestern range limit of *Tridens flavus*, where the author found it on a sand plain beside the Mississippi River in January, 1997. This sand plain, broken by riverine wetlands, stretches north through Whiteside Co. and much of Carroll Co. to Savanna, where limestone bluffs crowd the river. *Tridens flavus* was widespread and abundant in Rock Island and southern Whiteside Counties, growing in patches beside Illinois Highway 84, which parallels the river. Continuing north on this highway from its junction with U.S. Highway 30 in Whiteside Co., *T. flavus* was less frequently observed and in smaller colonies, but was found as far north as Savanna.

One more sand plain lies north of Savanna in Illinois. It is fully occupied by the Savanna Army Depot, to which immediate access was denied. Small patches of *Tridens flavus* were found on the periphery of this sand plain in Carroll and Jo Daviess Counties, suggesting it may occur in larger populations on this sand plain. This is the first report of *T. flavus* from Whiteside, Carroll, and Jo Daviess Counties, Illinois, as well as from eight counties in southern Wisconsin.

This grass is now abundant along sandy roadsides in northwestern Illinois, about 100 miles from the sandy area along the lower Wisconsin River in parts of Grant, Richland, Iowa, Sauk, and Dane Counties of Wisconsin. *Tridens flavus* currently occurs at four sites in this area and probably will become a prominent feature along sandy roadsides here in the near future. The La

Crosse Co. specimen suggests this process may occur in the sandy areas by the Mississippi River near La Crosse, and the Marquette Co. specimen suggests this may also occur in the "Central Sands" region of Wisconsin.

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LITERATURE CITED

- DEAM, C. C. 1940. Flora of Indiana. State of Indiana Dept. of Conservation, Indianapolis, IN.
- EILERS, L. J. AND D. M. ROOSA. 1994. The Vascular Plants of Iowa. Univ. Iowa Press, Iowa City, IA.
- FASSETT, N. C. 1951. Grasses of Wisconsin. Univ. Wisconsin Press, Madison, WI.
- FERNALD, M. L. 1950. Gray's Manual of Botany, 8th ed. American Book Co., New York.
- GLEASON, H. A. AND A. CRONQUIST. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada, 2nd ed. The New York Botanical Garden, Bronx, NY.
- GREAT PLAINS FLORA ASSOCIATION. 1986. Flora of the Great Plains. Univ. Kansas Press, Lawrence, KS.
- GRESS, E. M. 1924. The Grasses of Pennsylvania. Penn. Dept. of Agriculture, General Bull. No. 384, Harrisburg, PA.
- HITCHCOCK A. S. AND A. CHASE. 1950. Manual of the Grasses of the United States, 2nd revised ed. U.S. Dept. of Agriculture Publ. No. 200, Washington, DC.
- KARTESZ, J. T. 1994. A Synonymized Checklist of Vascular Flora of the United States, Canada, and Greenland. Timber Press, Portland, OR.
- MOHLENBROCK, R. H. 1986. Guide to the Vascular Flora of Illinois. Southern Illinois Univ. Press, Carbondale, IL.
- AND D. M. LADD. 1978. Distribution of Illinois Vascular Plants. Southern Illinois Univ. Press, Carbondale, IL.
- OWNBEY, G. B. AND T. MORLEY. 1991. Vascular Plants of Minnesota, a Checklist and Atlas. Univ. Minnesota, Minneapolis, MN.
- SEYMOUR, F. C. 1982. The Flora of New England. Phytologia Mem. V, Plainfield, NJ.
- SMALL, J. K. 1933. Manual of the Southeastern Flora. Published by the author, New York.
- STEYERMARK, J. A. 1963. Flora of Missouri. Iowa State Univ. Press, Ames, IA.

- SWINK, F. AND G. WILHELM. 1994. Plants of the Chicago Region, 4th ed. Indiana Acad. of Sci., Indianapolis, IN.
- VOSS, E. G. 1972. Michigan Flora, Part 1: Gymnosperms and Monocots. Cranbrook Institute Sci. Bull. No. 55. Bloomfield Hills, MI.
- YOUNG, D. 1994. Kane County Wild Plants & Natural Areas, 2nd ed. Kane Co. Forest Preserve District, Geneva, IL.